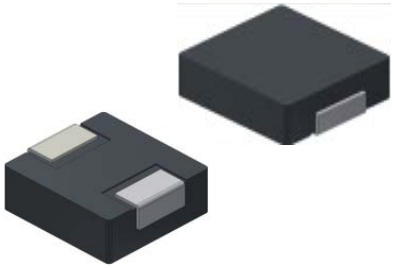
MetalLions

MMPC1205 Series

High Current Molded Power Inductors



FEATURES

- Carbonyl Powder.
- Compact design
- High current，low DCR，high efficiency.
- Frequency range up to 5MHz
- Very low acoustic noise and very low leakage flux noise.
- Operate temperature range .... －40℃～＋125℃(Including self temp. rise)
- RoHS compliant

APPLICATIONS

Note PC power system,incl. IMVP-6 DC/DC converter .

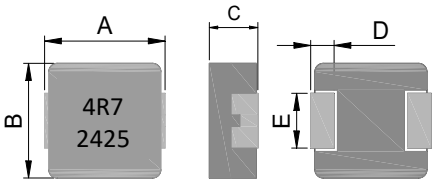
Part Numbering

MMPC 1205 -1R0 M T

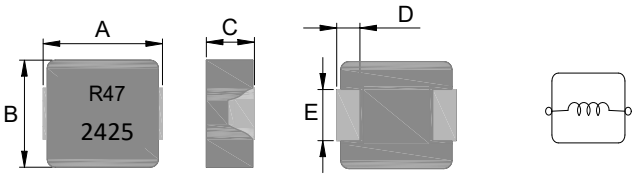
1 2 3 4 5

- 1:Product Series:Carbonyl Molding Power Inductor
- 2:Dimensions:
- 3: Initial inductance value: 1R0 = 1.0uH
- 4:Tolerance of Inductance: K=±10%，L=±15%，M=±20%，N=±25%，Y=±30%
- 5:Packing:Tape Carrier Package

Dimensions (mm)



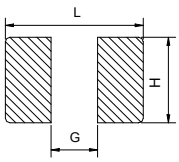
leadframe



non-leadframe

A	B	C	D	E
13.5±0.5	12.5±0.3	4.8±0.2	2.3±0.3	4.7±0.3

Recommend PC Board Pattern



L	G	H
14.2	8.0	5.0

Note: 1.PCB layout is referred to standard IPC-7351B
2. The above PCB layout reference only.
3. Recommend solder paste thickness at 0.15mm and above.

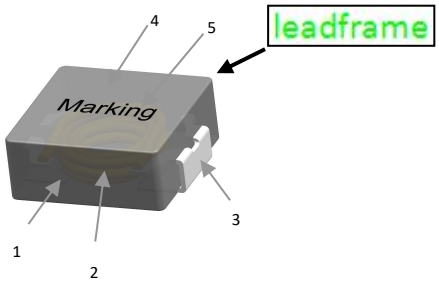
Electrical Properties:

Part Number	Inductance (uH) ± 20%	I rms (A)	I sat (A)	DCR (mΩ)		Type
		Typ	Typ	Typ	Max	
MMPC1205-R22MT	0.22	52.0	110	0.50	0.70	non-leadframe
MMPC1205-R33MT	0.33	42.0	80.0	0.70	0.90	non-leadframe
MMPC1205-R47MT	0.47	38.0	65.0	0.86	1.10	non-leadframe
MMPC1205-R56MT	0.56	36.0	55.0	1.00	1.50	non-leadframe
MMPC1205-R68MT	0.68	34.0	54.0	1.40	1.70	non-leadframe
MMPC1205-R82MT	0.82	31.0	52.0	1.70	2.10	non-leadframe
MMPC1205-1R0MT	1.00	29.0	50.0	1.85	2.50	non-leadframe
MMPC1205-1R5MT	1.50	27.0	48.0	2.80	3.30	non-leadframe
MMPC1205-2R2MT	2.20	20.0	32.0	4.20	5.50	leadframe
MMPC1205-3R3MT	3.30	15.0	32.0	6.80	9.20	leadframe
MMPC1205-4R7MT	4.70	12.0	27.0	11.4	15.0	leadframe
MMPC1205-5R6MT	5.60	11.5	22.0	12.3	16.5	leadframe
MMPC1205-6R8MT	6.80	11.0	21.0	14.5	18.5	leadframe
MMPC1205-8R2MT	8.20	9.50	18.0	16.8	22.5	leadframe
MMPC1205-100MT	10.0	9.00	16.0	21.4	25.5	leadframe
MMPC1205-150MT	15.0	8.20	13.0	32.0	38.0	leadframe
MMPC1205-220MT	22.0	6.50	10.0	50.0	58.0	leadframe
MMPC1205-330MT	33.0	5.00	8.00	73.0	88.0	leadframe
MMPC1205-470MT	47.0	4.00	6.50	100	120	leadframe
MMPC1205-680MT	68.0	3.50	5.50	135	162	leadframe
MMPC1205-820MT	82.0	3.00	4.80	198	238	leadframe

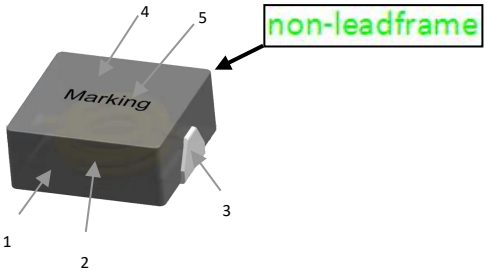
Note:

1. Test frequency : L : 100KHz /1.0V.
2. All test data referenced to 25℃ ambient.
3. Testing Instrument : L/Q: HP4284A,CH11025,CH3302,CH1320 ,CH1320S LCR METER / Rdc:CH16502,Agilent33420A MICRO OHMMETER.
4. Heat Rated Current (Irms) will cause the coil temperature rise approximately △T of 40℃
5. Saturation Current (Isat) will cause L0 to drop approximately 30%
6. The part temperature (ambient + temp rise) should not exceed 125℃ under worst case operating conditions.Circuit design,component,PCB trace size and thickness,airflow and other cooling provisions all affect the part temperature. Part temperature should be verified in the end application.
7. Irms Testing : Temperature rise is highly dependent on many factors including pcb land pattern, trace size, and proximity to other components. Therefore temperature rise should be verified in application conditions.
8. Rated DC current: The lower value of Irms and Isat

Material List



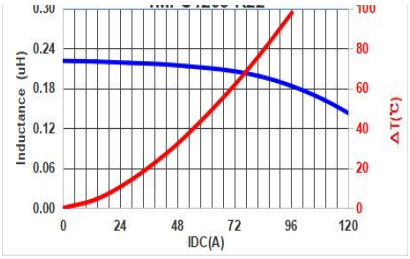
NO	Items	Materials
1	Core	Carbonyl Powder.
2	Wire	Polyester Wire or equivalent.
3	Clip	100% Pb free solder(Ni+Sn---Plating)
4	paint	Epoxy resin
5	Ink	Halogen-free ketone



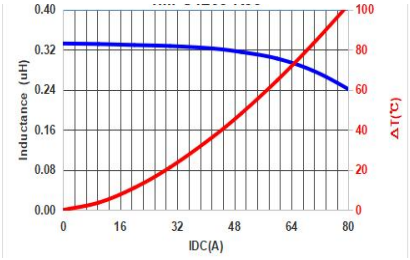
NO	Items	Materials
1	Core	Carbonyl Powder.
2	Wire	Polyester Wire or equivalent.
3	Solder	100% Pb free solder
4	paint	Epoxy resin
5	Ink	Halogen-free ketone

Typical Performance Curves

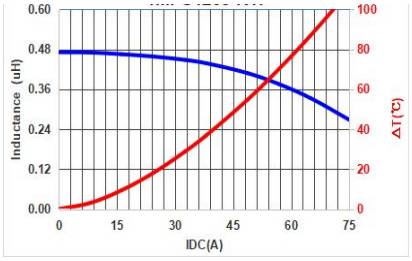
MMPC1205-R22MT



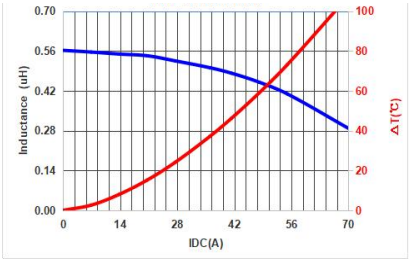
MMPC1205-R33MT



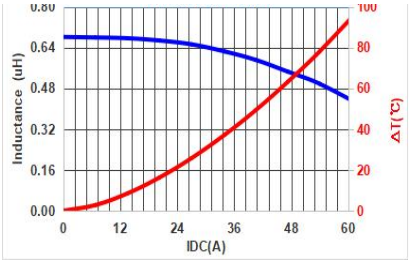
MMPC1205-R47MT



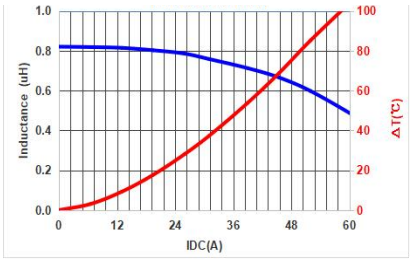
MMPC1205-R56MT



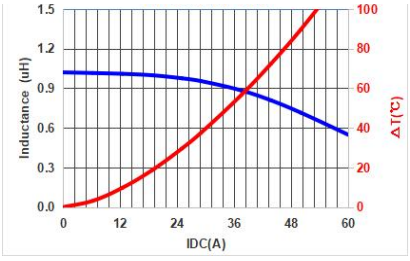
MMPC1205-R68MT



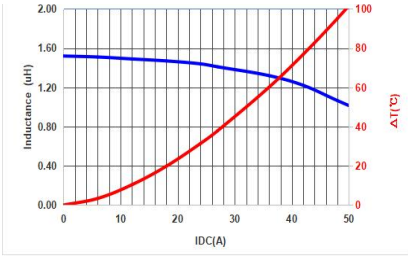
MMPC1205-R82MT



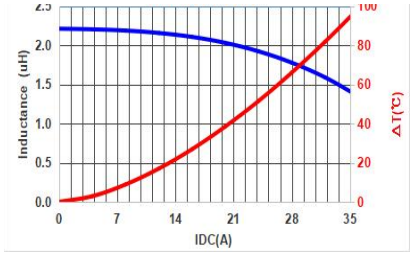
MMPC1205-1R0MT



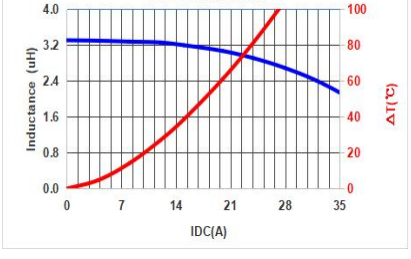
MMPC1205-1R5MT



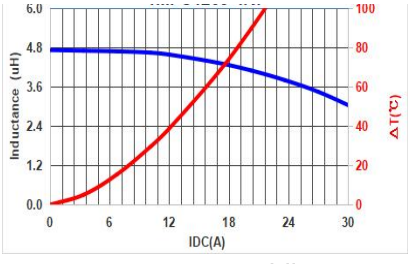
MMPC1205-2R2MT



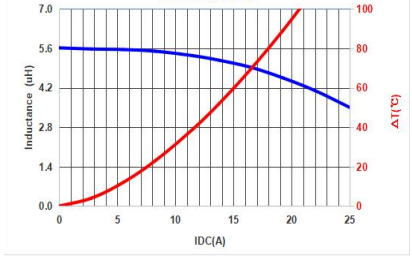
MMPC1205-3R3MT



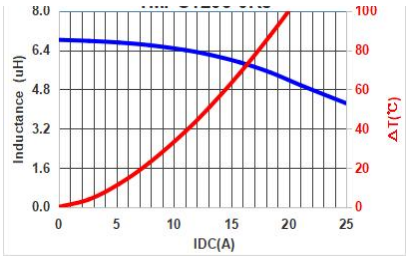
MMPC1205-4R7MT



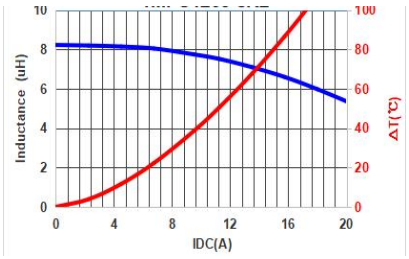
MMPC1205-5R6MT



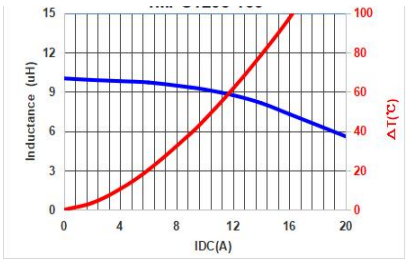
MMPC1205-6R8MT



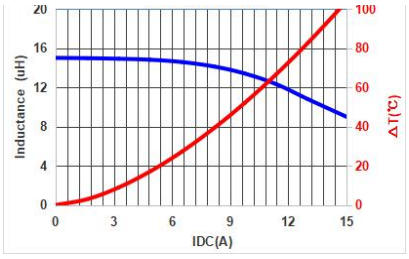
MMPC1205-8R2MT



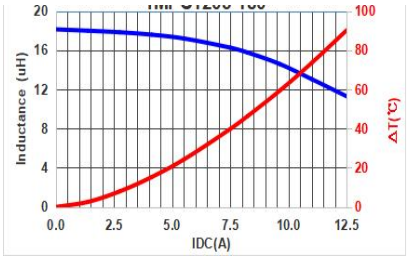
MMPC1205-100MT



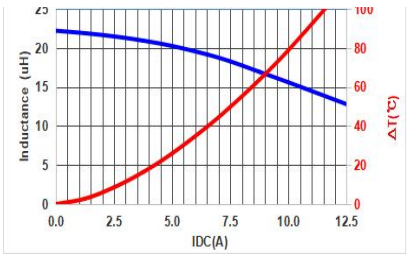
MMPC1205-150MT



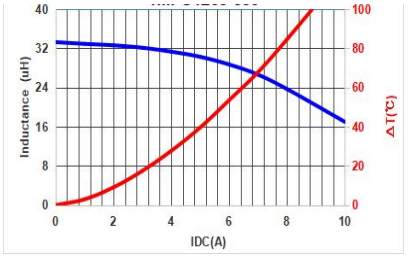
MMPC1205-180MT



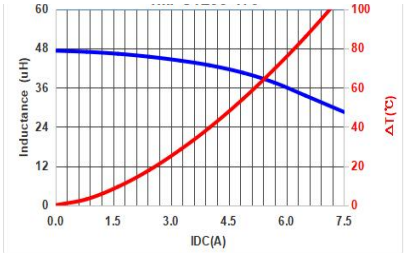
MMPC1205-220MT



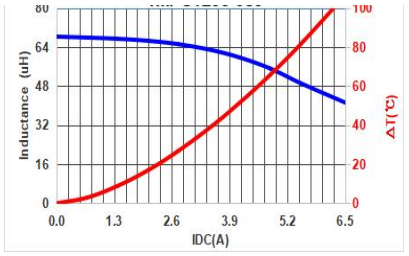
MMPC1205-330MT



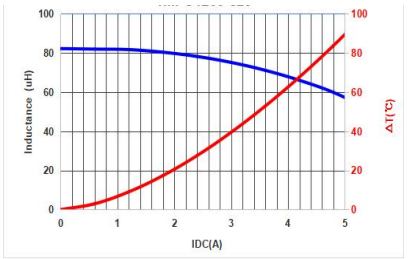
MMPC1205-470MT



MMPC1205-680MT



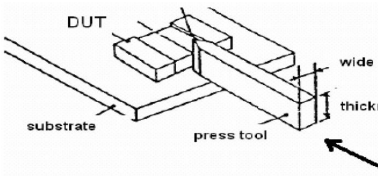
MMPC1205-820MT



Reliability and Test Condition

<table>
<tr><th>Item</th><th>Performance</th><th>Test Condition</th></tr>
<tr><td>Operating temperature</td><td>-40~+125℃ (Including self - temperature rise)</td><td></td></tr>
<tr><td>Storage temperature</td><td>1. -10~+40℃,50~60%RH (Product without taping)
2. -40~+125℃(on board)</td><td></td></tr>
<tr><td colspan="3">Electrical Performance Test</td></tr>
<tr><td>Inductance</td><td rowspan="2">Refer to standard electrical characteristics list.</td><td>HP4284A,CH11025,CH3302,CH1320,CH1320S
LCR Meter.</td></tr>
<tr><td>DCR</td><td>CH16502,Agilent33420A Micro-Ohm Meter.</td></tr>
<tr><td>Saturation Current (Isat)</td><td>Approximately △L30%.</td><td>Saturation DC Current (Isat) will cause L0
to drop △L(%)</td></tr>
<tr><td>Heat Rated Current (Irms)</td><td>Approximately △T40℃</td><td>Heat Rated Current (Irms) will cause the coil temperature rise △T(℃).
1.Applied the allowed DC current
2.Temperature measured by digital surface thermometer</td></tr>
<tr><td colspan="3">Reliability Test</td></tr>
<tr><td>Life Test</td><td rowspan="6">Appearance：No damage.
Inductance：within±10% of initial value
Q：Shall not exceed the specification value.
RDC：within ±15% of initial value and shall not exceed the specification value</td><td>Preconditioning: Run through IR reflow for 3times.
(IPC/JEDECJ-STD-020E Classification Reflow Profiles)
Temperature： 125±2℃(Inductor，ambient + temp rise)
Applied current：rated current
Duration：1000±12hrs
Measured at room temperature after placing for 24±2 hrs.</td></tr>
<tr><td>Load Humidity</td><td>Preconditioning: Run through IR reflow for 3times.
(IPC/JEDECJ-STD-020E Classification Reflow Profiles)
Humidity：85±2% R.H,
Temperature：85℃±2℃
Duration：1000hrs Min. Bead:with 100% rated current,
Inductance：with 100% rated current
Measured at room temperature after placing for 24±2 hrs.</td></tr>
<tr><td>Moisture Resistance</td><td>Preconditioning: Run through IR reflow for 3 times.
(IPC/JEDECJ-STD-020E Classification Reflow Profiles)
1. Baked at50℃ for 25hrs, measured at room temperature after placing for 4 hrs.
2. Raise temperature to 65±2℃ 90-100%RH in 2.5hrs, and keep 3 hours, cool down to 25℃ in 2.5hrs.
3. Raise temperature to 65±2℃ 90-100%RH in 2.5hrs, and keep 3 hours, cool down to 25℃ in 2.5hrs,keep at 25℃ for 2 hrs then keep at -10℃ for 3 hrs
4. Keep at 25℃ 80-100%RH for 15min and vibrate at the frequency of 10 to 55 Hz to 10 Hz, measure at room temperature after placing for 1~2 hrs.</td></tr>
<tr><td>Thermal shock</td><td>Preconditioning: Run through IR reflow for 3 times.
(IPC/JEDECJ-STD-020E Classification Reflow Profiles)
Condition for 1 cycle
Step1：-40±2℃ 30±5min
Step2：125±2℃ ≦0.5min
Step3：125±2℃ 30±5minNumber of cycles： 500
Measured at room fempraturc after placing for 24±2 hrs.</td></tr>
<tr><td>Vibration</td><td>Preconditioning: Run through IR reflow for 3 times.
(IPC/JEDECJ-STD-020E Classification Reflow Profiles)
Oscillation Frequency: 10Hz～2KHz～10Hz for 20 minutes
Equipment： Vibration checker
Total Amplitude: 10g
Testing Time : 12 hours(20 minutes, 12 cycles each of 3 orientations)。</td></tr>
<tr><td>Bending</td><td rowspan="2">Appearance：No damage.
Inductance：within±10% of initial value
Q：Shall not exceed the specification value.
RDC：within ±15% of initial value and shall not exceed the specification value</td><td>Shall be mounted on a FR4 substrate of the following dimensions: >=0805 inch(2012mm):40x100x1.2mm
<0805 inch(2012mm):40x100x0.8mm
Bending depth: >=0805 inch(2012mm):1.2mm
<0805 inch(2012mm):0.8mm
duration of 10 sec.</td></tr>
<tr><td>Shock</td><td>
<table>
<tr><th>Type</th><th>Peak value (g's)</th><th>Normal duration (D) (ms)</th><th>Wave form</th><th>Velocity change (Vi)ft/sec</th></tr>
<tr><td>SMD</td><td>50</td><td>11</td><td>Half-sine</td><td>11.3</td></tr>
<tr><td>Lead</td><td>50</td><td>11</td><td>Half-sine</td><td>11.3</td></tr>
</table>
3 shocks in each direction along 3 perpendicular axes(18 shocks).</td></tr>
</table>

<table>
<tr><th>Item</th><th>Performance</th><th>Test Condition</th></tr>
<tr><td>Solderability</td><td>More than 95% of the terminal electrode should be covered with solder。</td><td>a. Method B1, 4 hrs @155°C dry heat @255°C±5°C
Test time:5 +0/-0.5 seconds.

b. Method D category 3. (steam aging 8hours ± 15 min)@ 260°C±5°C
Test time: 30 +0/-0.5 seconds.</td></tr>
<tr><td>Resistance to Soldering Heat</td><td rowspan="2">Appearance：No damage.
Inductance：within±10% of initial value
Q：Shall not exceed the specification value.
RDC：within ±15% of initial value and shall not exceed the specification value e</td><td>Depth: completely cover the termination
<table><tr><th>Temperature(°C)</th><th>Time(s)</th><th>Temperature ramp/immersion and emersion rate</th><th>Number of heat cycles</th></tr><tr><td>260 ±5 (solder temp)</td><td>10 ±1</td><td>25mm/s ±6 mm/s</td><td>1</td></tr></table></td></tr>
<tr><td>Terminal Strength</td><td>Preconditioning: Run through IR reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles
With the component mounted on a PCB with the device to be tested,applyaforce(>0805inch(2012mm):1kg,<=0805inch(2012 mm):0.5kg)to the side of a device being tested. This force shall be applied for 60 +1 seconds. Also the force shall be applied gradually as not to apply a shock to the component being tested.

</td></tr>
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Note : When there are questions concerning measurement result : measurement shall be made after 48 ± 2 hours of recovery under the standard condition.

Soldering and Mounting

(1) Soldering

Mildly activated rosin fluxes are preferred. The minimum amount of solder can lead to damage from the stresses caused by the difference in coefficients of expansion between solder, chip and substrate. Metal-lionserminations are suitable for re-flow soldering systems. If hand soldering cannot be avoided, the preferred technique is the utilization of hot air soldering tools.

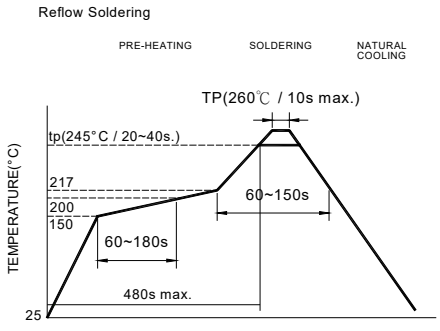
(2) Solder re-flow:

Recommended temperature profiles for re-flow soldering in Figure 1.

(3) Soldering Iron:

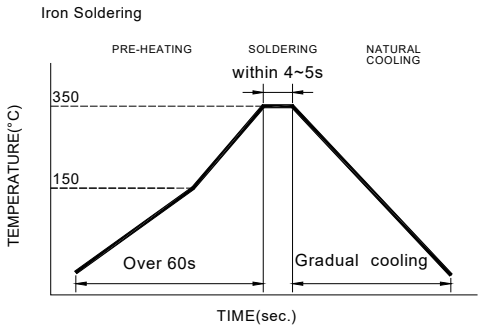
Products attachment with a soldering iron is discouraged due to the inherent process control limitations. In the event that a soldering iron must be employed the following precautions are recommended.

- Preheat circuit and products to 150℃
- 355℃ tip temperature (max)
- Never contact the ceramic with the iron tip
- 1.0mm tip diameter (max)
- Use a 20 watt soldering iron with tip diameter of 1.0mm
- Limit soldering time to 4~5sec.



Reflow times: 3 times max.

Fig.1

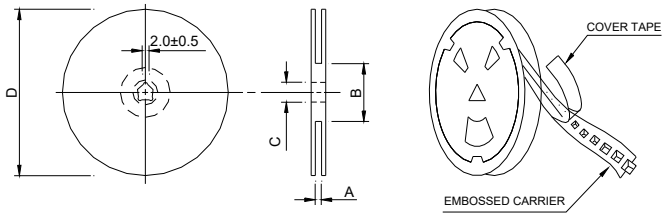


Iron Soldering times: 1 times max.

Fig.2

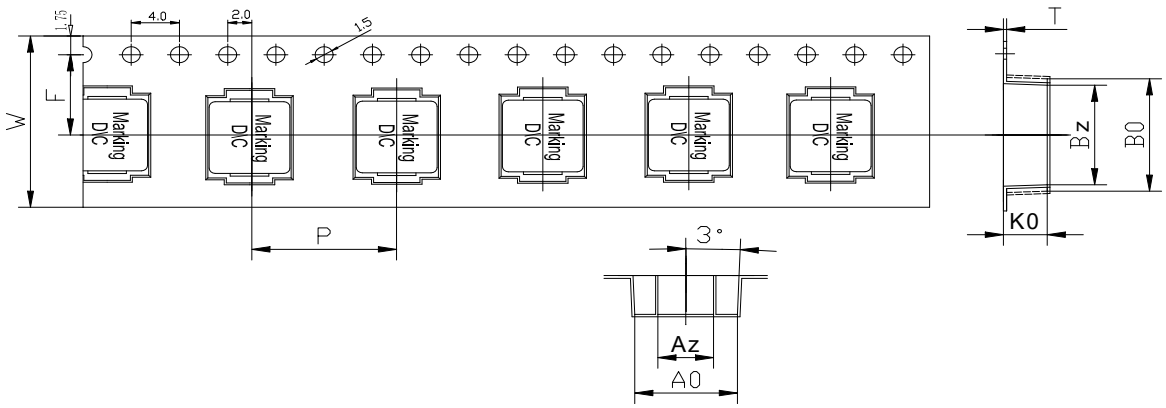
Packaging Information

(1) Reel Dimension



Type	A(mm)	B(mm)	C(mm)	D(mm)
13"x12mm	12.4+2/-0	100±2	13+0.5/-0.2	330

(2) Tape Dimension



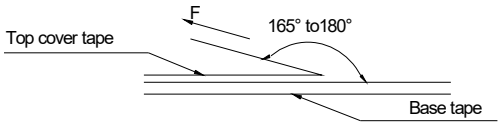
Bo	Bz	Ao	Az	Ko	P	W	F	t
14.1±0.1	13.0±0.1	12.9±0.1	7.0±0.1	5.5±0.1	16.0±0.1	24±0.3	11.5±0.1	0.35±0.05

Unit:mm

(3) Packaging Quantity

MMPC	1205
Chip / Reel	500

(4) Tearing Off Force



The force for tearing off cover tape is 10 to 130 grams in the arrow direction under the following conditions(referenced ANSI/EIA-481-C-2003 of 4.11 stadnard).

Room Temp. (℃)	Room Humidity (%)	Room atm (hPa)	Tearing Speed mm/min
5~35	45~85	860~1060	300

Application Notice

- Storage Conditions (component level)
  To maintain the solderability of terminal electrodes:
  1. Metal-lions products meet IPC/JEDEC J-STD-020D standard-MSL, level 1.
  2. Temperature and humidity conditions: Less than 40℃ and 60% RH.
  3. Recommended products should be used within 12 months form the time of delivery.
  4. The packaging material should be kept where no chlorine or sulfur exists in the air.
- Transportation
  1. Products should be handled with care to avoid damage or contamination from perspiration and skin oils.
  2. The use of tweezers or vacuum pick up is strongly recommended for individual components.
  3. Bulk handling should ensure that abrasion and mechanical shock are minimized.